

CLAIMS

What We Claim Is:

1. A sensor diaphragm comprising a plurality of diaphragm layers which are arranged in a mutually superposed relationship and which include a conveyor diaphragm (1), a first electrically conductive diaphragm layer (2) arranged therebeneath, an electrically insulating diaphragm layer (3) arranged therebeneath and a second electrically conductive diaphragm layer (4) arranged therebeneath, wherein the first and second conductive diaphragm layers (2, 4) are separated from each other and electrically insulated by the electrically insulating diaphragm layer (3) and the second electrically conductive diaphragm layer (4) has through portions (7) which engage through openings (5) in the electrically insulating diaphragm layer (3) and through openings (6) in the first electrically conductive diaphragm layer (2) and the electrically insulating diaphragm layer (3) has portions (12) which engage through the openings (5) in the first conductive diaphragm layer.
2. A sensor diaphragm according to claim 1 wherein the conveyor diaphragm (1) is made from a flexible, chemically inert plastic material.
3. A sensor diaphragm according to claim 2 wherein the plastic material is polytetrafluoroethylene (PTFE).
4. A sensor diaphragm according to claim 1 wherein the electrically conductive (2, 4) and electrically insulating (3) diaphragm layers comprise a rubber material.

5. A sensor diaphragm according to claim 2 wherein the electrically conductive (2, 4) and electrically insulating (3) diaphragm layers comprise a rubber material.
6. The sensor diaphragm of claim 4 wherein the rubber material is an EPDM (ethylene-propylene terpolymer reinforced with plastic fibers).
7. A sensor diaphragm according to claim 4 wherein the electrically conductive diaphragm layers (2, 4) of rubber include an admixture of carbon particles in an amount such that the diaphragm layers are electrically conductive.
8. A sensor diaphragm according to claim 5 wherein the electrically conductive diaphragm layers (2, 4) of rubber include an admixture of carbon particles in an amount such that the diaphragm layers are electrically conductive.
9. A sensor diaphragm according to claim 6 wherein the electrically conductive diaphragm layers (2, 4) of rubber include an admixture of carbon particles in an amount such that the diaphragm layers are electrically conductive.
10. A sensor diaphragm according to claim 1 wherein the through portions are arranged in a proximity of diaphragm regions which are flexed in a diaphragm stroke movement.

11. A sensor diaphragm according to claim 4 wherein the through portions are arranged in a proximity of diaphragm regions which are flexed in a diaphragm stroke movement.
12. A sensor diaphragm according to claim 1 wherein the diaphragm is substantially in the shape of a circular disc.
13. A sensor diaphragm according to claim 1 wherein the diaphragm layers are of substantially the same diameter.
14. A sensor diaphragm according to claim 1 wherein the through portions through the first electrically conductive diaphragm layer (2) are of a circular, circular segment-shaped, kidney-shaped, square or oval form.
15. A sensor diaphragm according to claim 4 wherein the through portions through the first electrically conductive diaphragm layer (2) are of a circular, circular segment-shaped, kidney-shaped, square or oval form.
16. A sensor diaphragm according to claim 1 wherein the through portions are arranged symmetrically around the center point of the diaphragm.
17. A sensor diaphragm according to claim 1 wherein a through portion is arranged at the center point of the diaphragm.

18. A sensor diaphragm according to claim 4 wherein a through portion is arranged at the center point of the diaphragm.
19. A sensor diaphragm according to claim 10 wherein a through portion is arranged at the center point of the diaphragm.
20. A sensor diaphragm according to claim 1 wherein between 4 and 20 through portions are arranged symmetrically around a center point of the diaphragm.
21. A sensor diaphragm according to claim 1 wherein the through portions through the first electrically conductive diaphragm layer (2) form concentric circles around a center point of the diaphragm.
22. A sensor diaphragm according to claim 1 wherein the conveyor diaphragm (1) has at least one sealing ridge (8) which extends concentrically around a center point of the diaphragm and which is arranged in a clamping region (9) of the diaphragm.
23. A sensor diaphragm according to claim 1 wherein the diaphragm has a diaphragm core (10) which is arranged beneath the second conductive diaphragm layer (4) symmetrically with respect to a center point of the diaphragm.

24. A sensor diaphragm according to claim 1 wherein the sensor diaphragm has a further electrically insulating diaphragm layer (11) of rubber between the second conductive diaphragm layer (4) and the diaphragm core (10), which is positively connected to the diaphragm core (10).
25. A sensor diaphragm according to claim 24 wherein layers (1, 2, 3, 4, 11) of the diaphragm are sealed together.
26. A sensor diaphragm according to claim 1 wherein the electrically conductive diaphragm layers (2, 4) are connected to two terminals of an electrical measuring device.
27. A sensor diaphragm according to claim 1 wherein the conductive diaphragm layers (2, 4) are contacted by means of metallic contact pins (13, 14), wherein the pin (13) contacts the first conductive diaphragm layer (2) and engages through the second conductive diaphragm layer (4) and through the insulating diaphragm layer (3) and is insulated from the second conductive diaphragm layer (4).
28. The sensor diaphragm of claim 27 wherein pin 13 is insulated from second diaphragm layer (4) with material of insulating diaphragm layer (3).
29. A diaphragm pump comprising a sensor diaphragm according to claim 1.